भारतीय मानक
Indian Standard

IS 16205 (Part 23) : 2017

केबल प्रबंधन के लिए कन्डयूट प्रणालियॉ

भाग 23 विशेष अपेक्षाएँ – लचीली कन्डयूट प्रणालियॉ

Conduit Systems for Cable Management

Part 23 Particular Requirements Flexible Conduit Systems

ICS 29.120.10

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली-110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.org.in www.standardsbis.in

September 2017 **Price Group 3**

Electric Wiring Accessories Sectional Committee, ETD 14

FOREWORD

This Indian Standard (Part 23) was adopted by the Bureau of Indian Standards, after the draft finalized by the Electric Wiring Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

This standard (Part 23) specifies requirements for flexible conduit systems. The other part in the series is:

Part 1	General requirements
Part 21	Particular requirements — Rigid conduit systems
Part 22	Particular requirements — Pliable conduit systems
Part 24	Particular requirements — Conduit systems buried under ground

This standard is based on IEC 61386-23 Conduit systems for cable management — Part 23 Particular requirements — Flexible conduit systems, issued by International Electrotechnical Commission (IEC) with the following modifications:

a) Reference temperature has been changed, and
b) Referred to standards have been changed.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values or analysis (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CONDUIT SYSTEMS FOR CABLE MANAGEMENT

PART 23 PARTICULAR REQUIREMENTS FLEXIBLE CONDUIT SYSTEMS

1 SCOPE

This clause of IS 16205 (Part 1) is applicable, except as follows:

Addition:

This part of IS 16205 specifies the requirements for flexible conduit systems.

2 NORMATIVE REFERENCES

This clause of IS 16205 (Part 1) is applicable.

3 DEFINITIONS

This clause of IS 16205 (Part 1) is applicable.

4 GENERAL REQUIREMENTS

This clause of IS 16205 (Part 1) is applicable.

5 GENERAL CONDITIONS FOR TESTS

This clause of IS 16205 (Part 1) is applicable.

6 CLASSIFICATION

This clause of IS 16205 (Part 1) is applicable, except as follows:

6.1.3 1, **6.1.3 2** and **6.1.3 3** are not applicable.

NOTE — Flexible conduit systems according to **6.1.1 1, 6.1.1. 2**, **6.1.2 1**, **6.1.2 2** and classification 1X from **6.2.1**, Table 1 are not allowed in France.

7 MARKING AND DOCUMENTATION

This clause of IS 16205 (Part 1) is applicable, except as follows:

Addition:

7.1.101 The conduit shall be marked in accordance with **7.1** along its entire length at regular intervals of preferably 1 m but not longer than 3 m. Where this is technically impractical, the mark shall be on a label attached to the product at each end, or on the packaging.

Compliance is checked by inspection.

7.1.102 The manufacturer shall document or add to the packaging for the system the minimum inside diameter, the minimum bend radius and the classification in accordance with **6**.

Compliance is checked by inspection.

8 DIMENSIONS

Replacement:

8.1 Threads shall comply with IS 14763.

Compliance is checked by means of the gauges specified in IS 14763.

8.2 The minimum inside diameter of the conduit system shall be as declared by the manufacturer.

Compliance is checked by measurement.

9 CONSTRUCTION

This clause of IS 16205 (Part 1) is applicable.

10 MECHANICAL PROPERTIES

This clause of IS 16205 (Part 1) is applicable, except as follows:

10.1 Mechanical Strength

10.1.1 *Addition:*

NOTE — Very light flexible conduits should not be considered as providing adequate mechanical protection and should not be used within the construction of buildings.

10.4 Bending Test

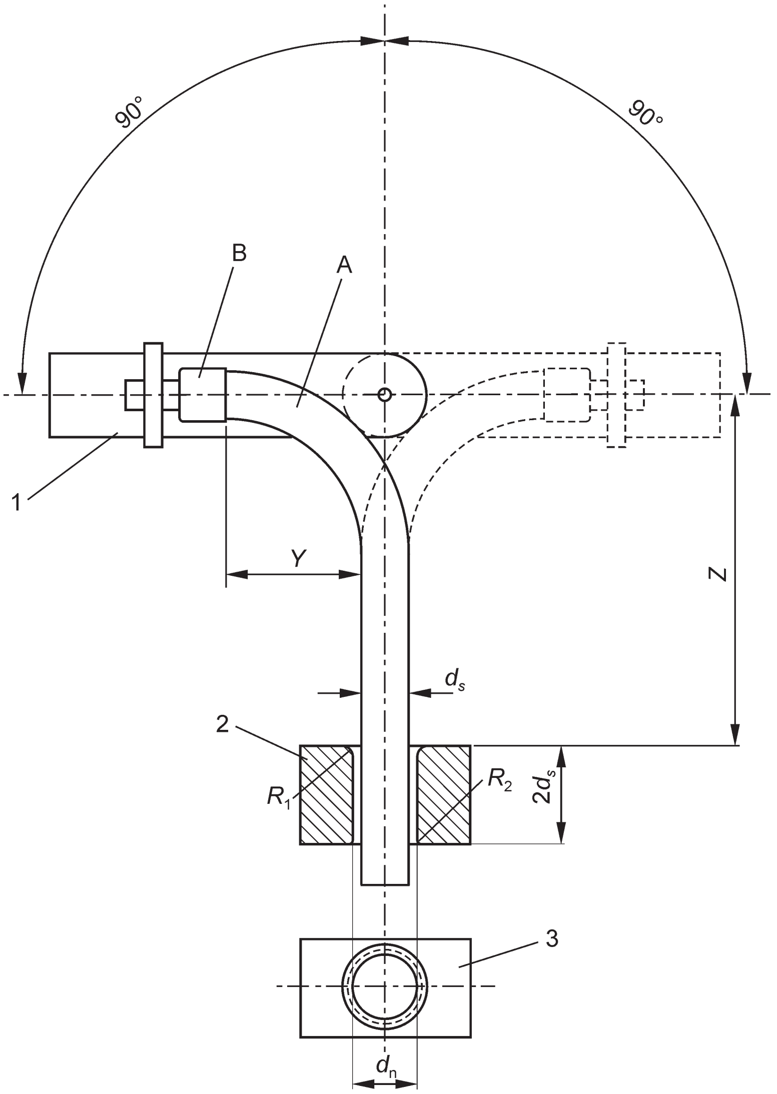
This clause of IS 16205 (Part 1) is not applicable.

10.5 Flexing Test

10.5.1 An assembly consisting of a conduit with a terminating conduit fitting, assembled in accordance with the manufacturer's instructions, shall be subjected to a flexing test by means of the apparatus shown in Fig. 1.

10.5.2 The test shall be made on six samples of conduit of an appropriate length. Three of the samples shall be tested at the minimum declared transport, application and installation temperature as given in Table 1 of IS 16205 (Part 1) with a tolerance of ± 2°C. The other three samples shall be tested at the maximum declared application and installation temperature as given in Table 2 of IS 16205 (Part 1) with a tolerance of ± 2°C.

A manufacturer may declare that a flexible conduit is suitable for transport and installation according to Table 1 of IS 16205 (Part 1) but may only be suitable for flexing at ambient temperature as a minimum. In



Key

A	Conduit
B	Terminating fitting
d_s	Outside diameter of conduit (A)
d_n	Inside diameter of support block: 1.1 × d_s
R_1	Radius of support block: 0.5 × d,
R_2	Radius of support block: 0.25 × d_s
Y	Minimum bend radius, declared by the manufacturer
Z	1.5 × Y
1	Oscillating member
2	Guide support block
3	Plan view of guide support block

NOTE — This drawing is not intended to govern design except as regards the dimensions shown.

FIG. 1 FLEXING TEST APPARATUS

this case the test shall be carried out at 20 ± 2°C and the 3rd digit of the classification code shall be X. The manufacturer shall clearly declare in his literature both the minimum transport and installation temperature in accordance with Table 1 of IS 16205 (Part 1) the minimum application temperature which is ambient and the maximum installation and application temperature in accordance with Table 2 of IS 16205 (Part 1).

10.5.3 The sample shall be fixed to the oscillating member by means of the terminating conduit fitting as shown in Fig. 1, so that when the conduit is at the middle of its travel, the axis of the conduit is vertical and passes through the axis of the oscillation. The apparatus with the sample shall be conditioned for 2 h or until the sample has attained the declared temperature, whichever period is the longer.

10.5.4 The oscillating member shall be moved backwards and forwards through a total angle of 180 ± 5° divided equally about the vertical axis. The assembly shall be subjected to 5 000 flexings at a rate of 40 ± 5 flexings per minute. A flexing constitutes, starting from the vertical position, one continuous cycle of movement of essentially sinusoidal forms.

10.5.5 After the test, the sample shall show no sign of disintegration, nor shall there be any cracks visible to normal or corrected vision without magnification.

10.6 Collapse Test

This clause of IS 16205 (Part 1) is not applicable.

10.7 Tensile Strength

This clause of IS 16205 (Part 1) is applicable, except as follows:

10.7.1 *Replacement:*

For conduit systems where tensile strength is not declared, the tensile strength of the joint shall comply with classification 1 in Table 6 of IS 16205 (Part 1).

11 ELECTRICAL PROPERTIES

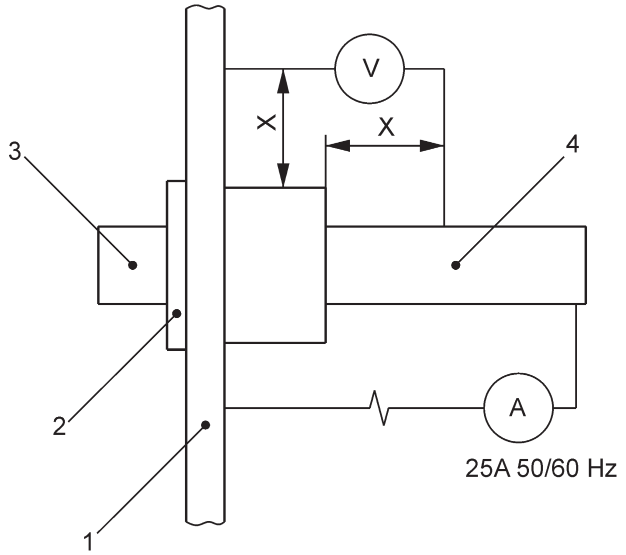
This clause of IS 16205 (Part 1) is applicable, except as follows:

11.1 Bonding Test

Replacement:

A sample of a conduit and terminating conduit fitting shall be assembled in accordance with the manufacturer's instructions and mounted as shown in Fig. 3. A current of 25 A, having a frequency of 50 Hz to 60 Hz, derived from an a.c. source having a no-load voltage not exceeding 12 V, shall be passed through the assembly for 60^{+5}_{0} s. Then the voltage drop shall be measured between the points shown in Fig. 3 and the resistance calculated from the current and this voltage drop.

The resistance shall not exceed 0.05 Ω.



Key

X	12 mm ± 2 mm
1	3 mm steel plate
2	Optional locknut
3	Terminating conduit fitting secured to plate by tapped hole or by locknut on fitting thread
4	Conduit

NOTE — This drawing is not intended to govern design except as regards the dimensions shown.

FIG. 2 ASSEMBLY OF CONDUIT AND TERMINATING CONDUIT FITTING FOR BONDING TEST

Where special devices are required for the coupling of conduit and conduit fittings, they shall be sufficient to remove the protective coating from the conduit, or the protective finish shall be removed in accordance with the manufacturer's instructions.

12 THERMAL PROPERTIES

This clause of IS 16205 (Part 1) is applicable, except as follows:

12.3 Replacement

The load is then removed and immediately after its removal it shall be possible to pass the appropriate gauge, in accordance with Fig. 2, through the conduit under its own weight and without any initial speed, with the sample in the vertical position.

13 FIRE EFFECTS

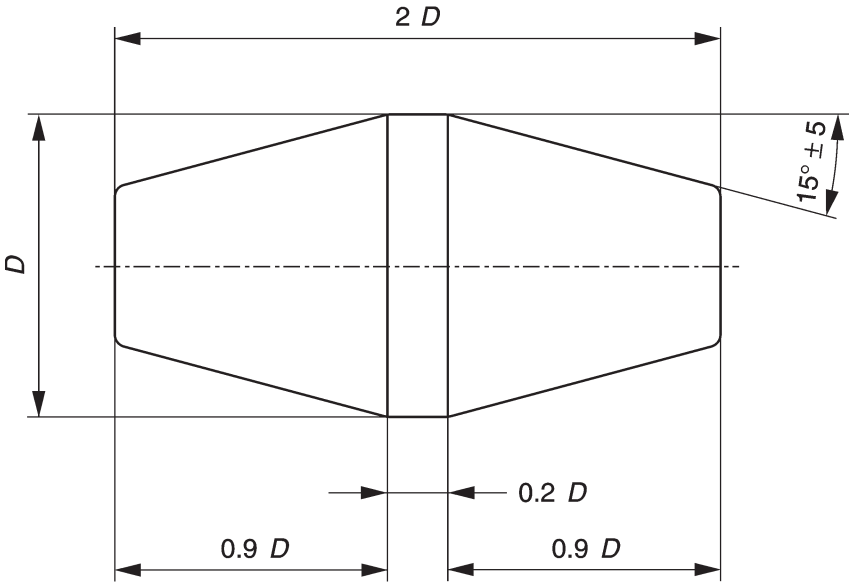
This clause of IS 16205 (Part 1) is applicable.

14 EXTERNAL INFLUENCES

This clause of IS 16205 (Part 1) is applicable.

15 ELECTROMAGNETIC COMPATIBILITY

This clause of IS 16205 (Part 1) is applicable.



D	80 percent of the manufacturer's declared minimum inside diameter of the conduit system
Material	Steel, hardened and polished, edges slightly rounded
Manufacturing tolerance	$^{+0.05}_{\ \ 0}$
Tolerance and axial dimension	±0.2 mm
Admissible wear	0.01 mm

NOTE — This drawing is not intended to govern design except as regards the dimensions shown.

FIG. 3 GAUGE FOR CHECKING THE MINIMUM INSIDE DIAMETER OF THE CONDUIT SYSTEM AFTER IMPACT AND RESISTANCE TO HEAT TESTS

ANNEX A

(*Normative*)

CLASSIFICATION CODING FOR CONDUIT SYSTEMS

This annex of IS 16205 (Part 1) is applicable.

ANNEX B

(*Normative*)

DETERMINATION OF MATERIAL THICKNESS

This annex of IS 16205 (Part 1) is applicable.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.org.in

Regional Offices:

		Telephones
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700054	2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, CHANDIGARH 160019	26 50206 265 0290
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	2254 1216, 2254 1442 2254 2519, 2254 2315
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